

Application/Control Number: 10/734,072

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1. A method of forming a radio frequency communication device comprising:

- providing a recess within a substrate;
- providing at least a portion of an antenna within the recess;
- providing an integrated circuit at least partially within the recess and in operative electrical connection with the antenna; and

wherein the antenna is a loop antenna which crosses itself at a bypass, said bypass comprising dielectric material between crossing portions of the loop antenna.

2. A method of forming an integrated circuit within a substrate comprising:

- if providing a recess in a substrate;
- providing substantially an entirety of an antenna within the recess; and
- providing an integrated circuit chip and a battery supported by the substrate and in operative electrical connection with the antenna.

3. A method of forming an integrated circuit within a substrate comprising:

- providing a recess in a substrate;
- providing at least a portion of an antenna within the recess;
- providing an integrated circuit chip and a battery supported by the substrate and in operative electrical connection with the antenna; and
- wherein the antenna is provided within the recess and on a portion of the substrate outside of the recess.

4. The method of claim 3 wherein the antenna comprises a predominate portion within the recess.

5. The method of claim 3 wherein the antenna comprises a predominate portion outside of the recess.

6. A method of forming an integrated circuit within a substrate comprising:

- providing a recess in a substrate;
- providing at least a portion of an antenna within the recess;
- providing an integrated circuit chip and a battery supported by the substrate and in operative electrical connection with the antenna; and
- wherein the antenna is a loop antenna which crosses itself at a bypass, said bypass comprising dielectric material between crossing portions of the loop antenna.

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7. The method of claim 3 wherein at least one of the battery and the integrated circuit chip are provided at least partially within the recess.

8. The method of claim 3 wherein the battery is bonded to the substrate within the recess.

9. The method of claim 3 wherein the step of providing the antenna comprises printing a conductive film.

10. The method of claim 3 wherein the step of providing the antenna comprises pad printing a conductive film.

11. A method of forming an integrated circuit within a substrate comprising:

providing a recess in a substrate;

providing at least a portion of a loop antenna within the recess, the loop antenna comprising a bypass where portions of the antenna cross one another, the bypass comprising a dielectric material between the crossing portions of the antenna; and

providing an integrated circuit chip in operative electrical connection with the antenna.

12. The method of claim 11 wherein the portions of the antenna which cross one another are substantially perpendicular to one another.

13. A method of forming an integrated circuit within a substrate comprising:

providing a recess in a substrate;

pad printing a conductive material within the recess to form at least a portion of a conductive circuit within the recess and to form at least a portion of an antenna within the recess;

placing an integrated circuit chip within the recess and bonding the integrated circuit chip to the conductive circuit and the antenna; and

placing a battery within the recess and in electrical connection with the integrated circuit chip.

14. The method of claim 13 wherein the substrate is a card configured for carrying on a person.

15. The method of claim 13 further comprising, after the printing, providing an electroless metal within the recess to selectively plate the conductive circuit.

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16. The method of claim 13 further comprising, after bonding the chip to the conductive circuit, filling the recess with a liquid encapsulation material and curing the encapsulation material into a solid mass.

17. The method of claim 13 further comprising, after bonding the chip to the conductive circuit, covering the recess with a protective cover.

18. A method of forming an integrated circuit within a substrate comprising:

- 3) providing a substrate having a recess formed therein, said recess having a bottom surface and a sidewall surface joined to the bottom surface;
- pad printing a conductive film within the recess to form electrical interconnects within the recess and to form at least a portion of an antenna, the electrical interconnects extending along the bottom surface and the sidewall surface of the recess;
- 5) placing an integrated circuit chip within the recess and in electrical connection with the electrical interconnects;
- 3) covering the integrated circuit and the conductive film within the recess with a protective cover; and
- wherein the integrated circuit comprises radio frequency identification device circuitry, and further comprising placing a battery within the recess and in electrical connection with the radio frequency identification device circuitry through the electrical interconnects.

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19. (Amended) A method of forming a device comprising:

providing a recess within a substrate;

providing at least a portion of an RF antenna within the recess;

providing an integrated circuit at least partially within the recess and in operative electrical connection with the antenna; and

wherein the antenna crosses itself at a bypass, said bypass comprising dielectric material between crossing portions of the antenna.

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